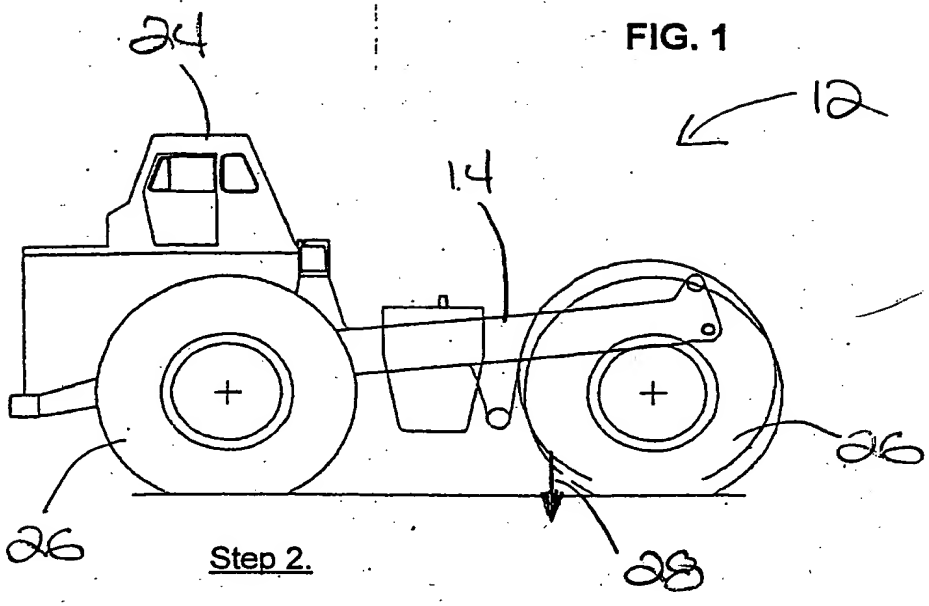
FIG. 1



Step 2.

Using truck chassis empty and loaded weights establish "Load" center of gravity.

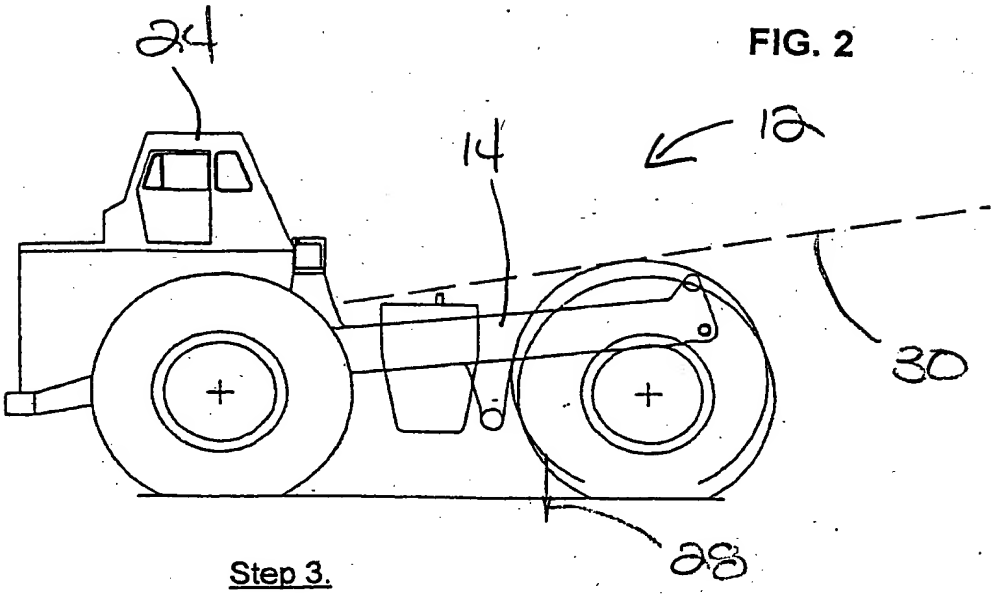


FIG. 2

Step 3.

Establish proposed body floor line.

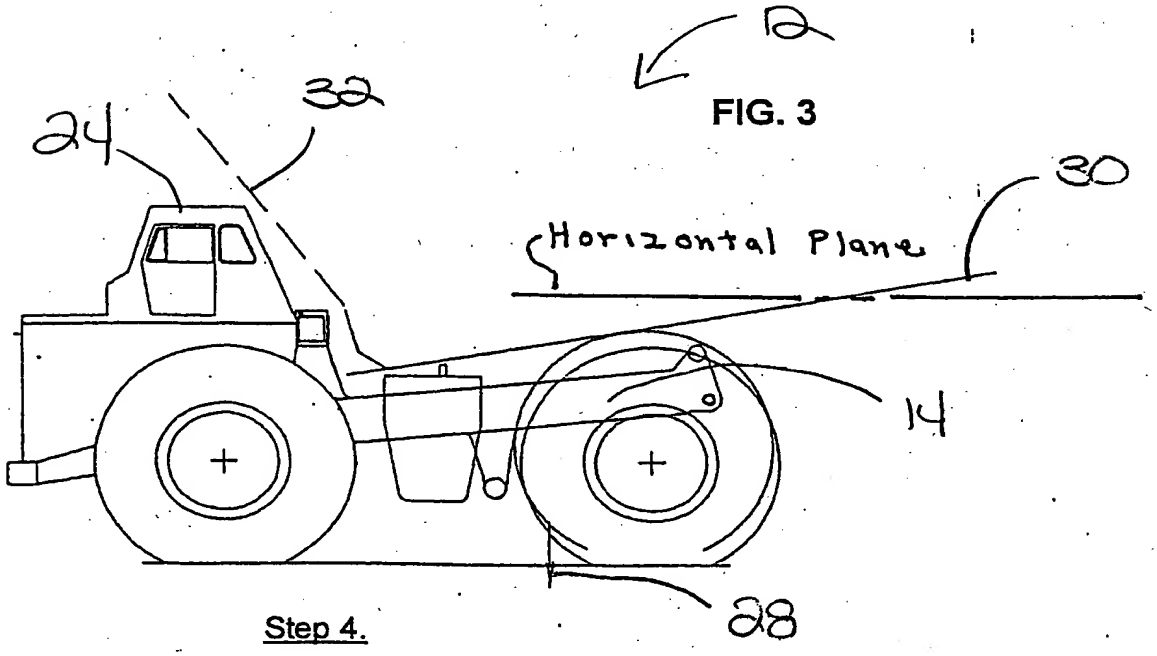


FIG. 3

Step 4.

Establish proposed body front slope line.

FIG. 4

Step 5.

Determine inside body width typically 90-115% of the overall rear axle tire width or as set by the truck chassis manufacturer.

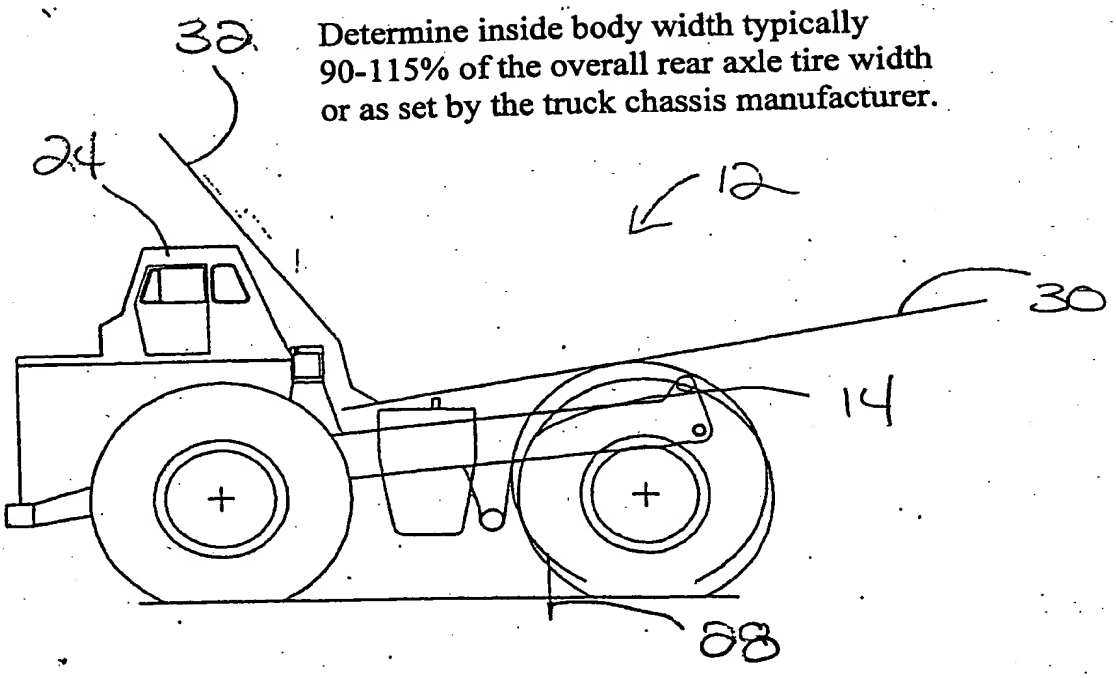
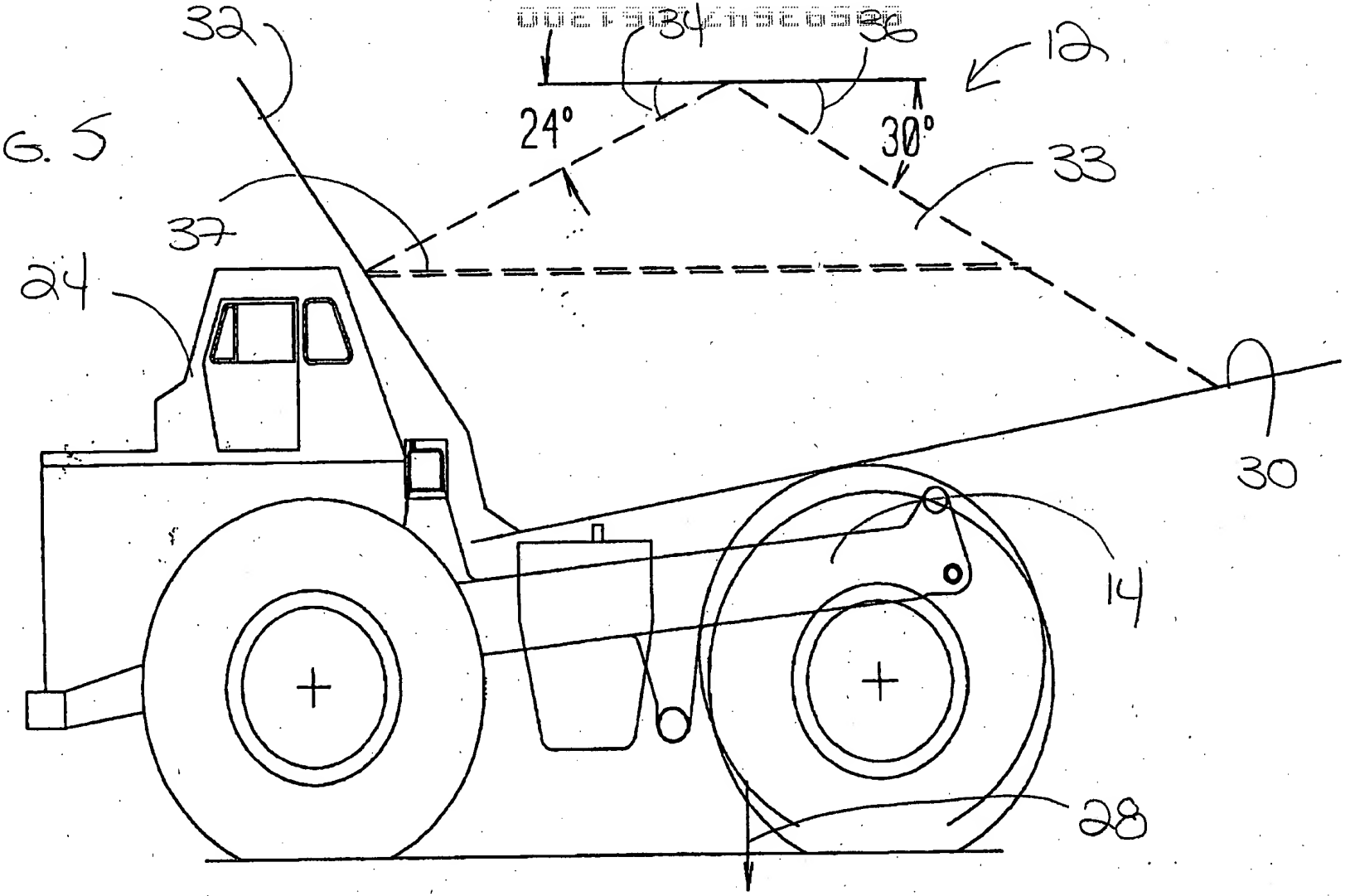
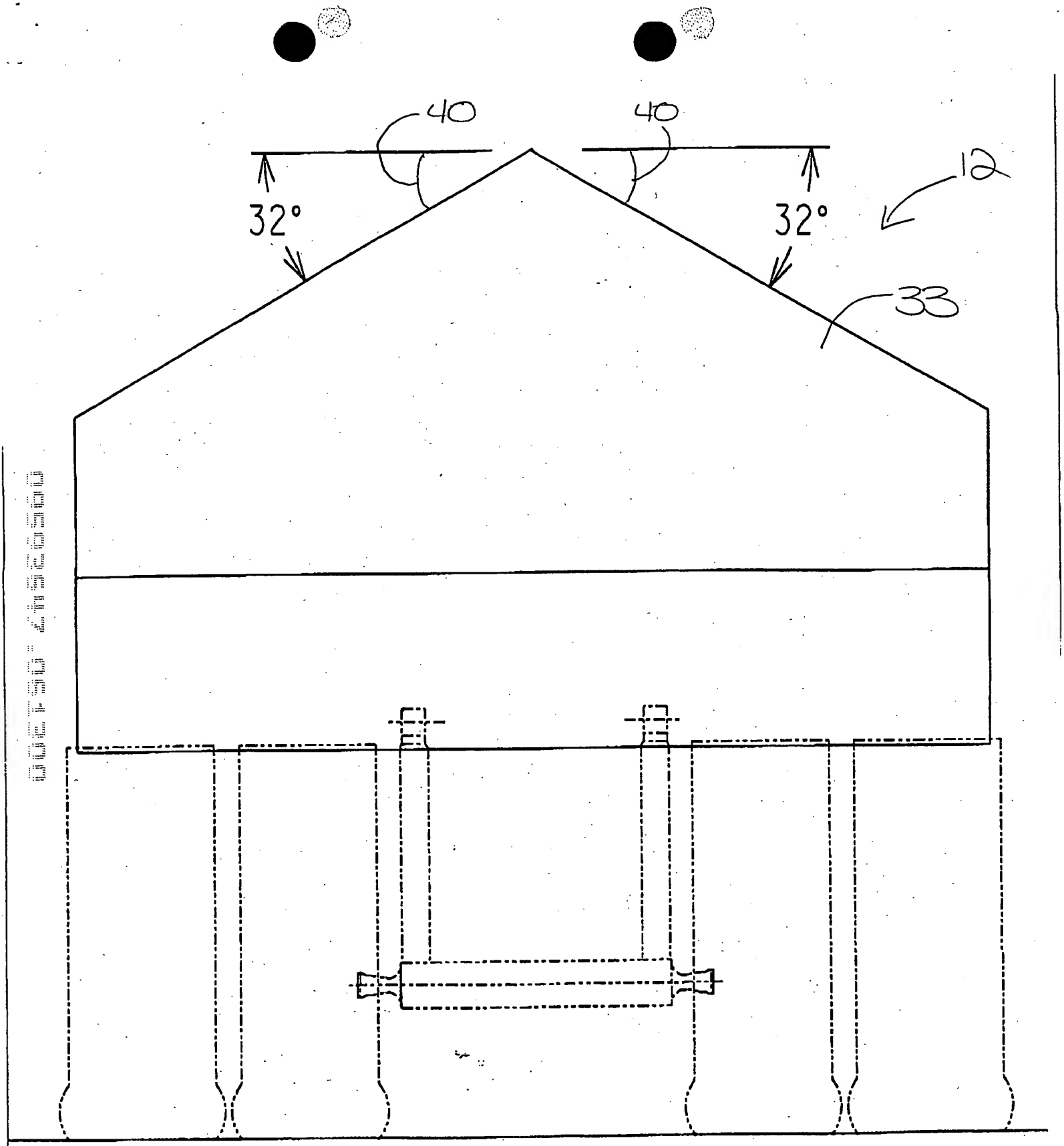


FIG. 5



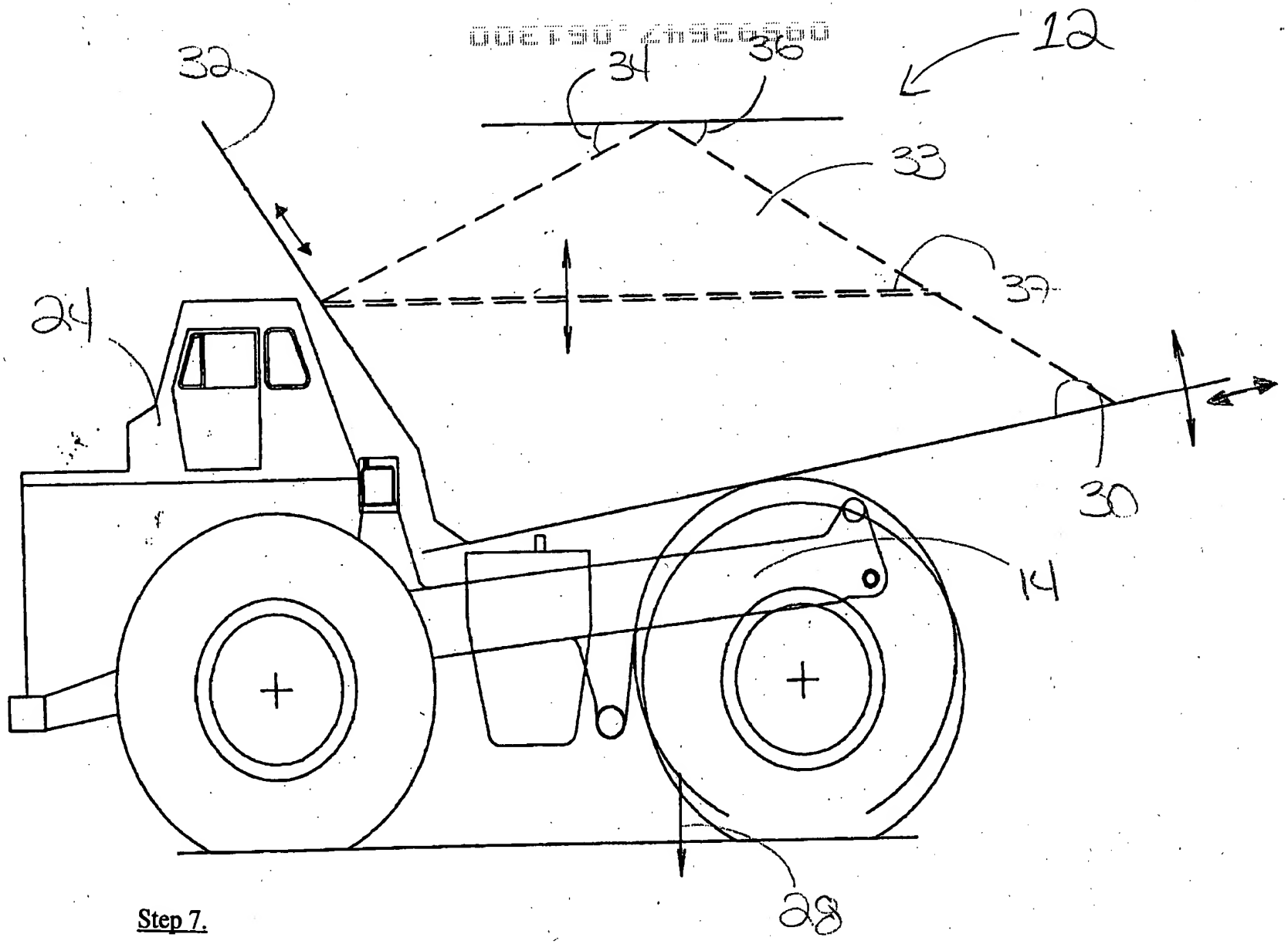
Step 6.

Using customer specific information, develop an approximate heap profile. Determine the center of gravity of the approximate heap profile and compare it to the correct center of gravity of Step 2.



Step 6.

FIG. 6



Step 7.

Adjust body floor line, body front slope line and body sidewalls as needed to obtain the correct center of gravity of Step 2.

FIG. 7

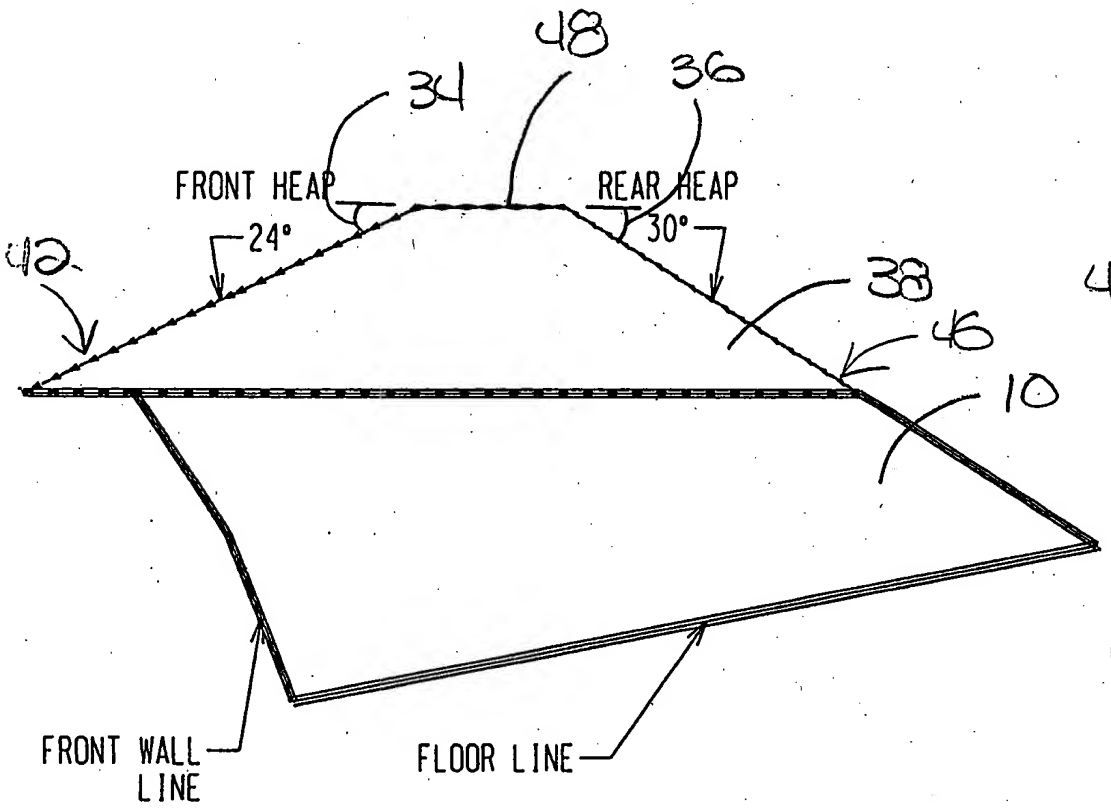


FIG. 3A

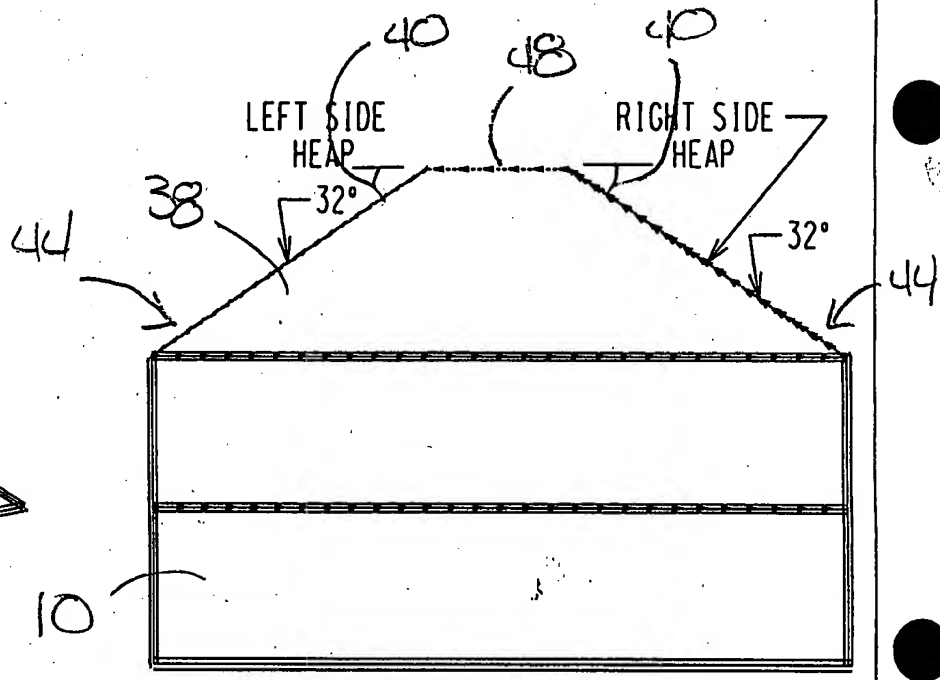


FIG. 3B

Step 8.

Based on the specific customer information and the resulting load profile, a three dimensional model is developed which incorporates the actual side, front and rear angles of material repose and corner voids.

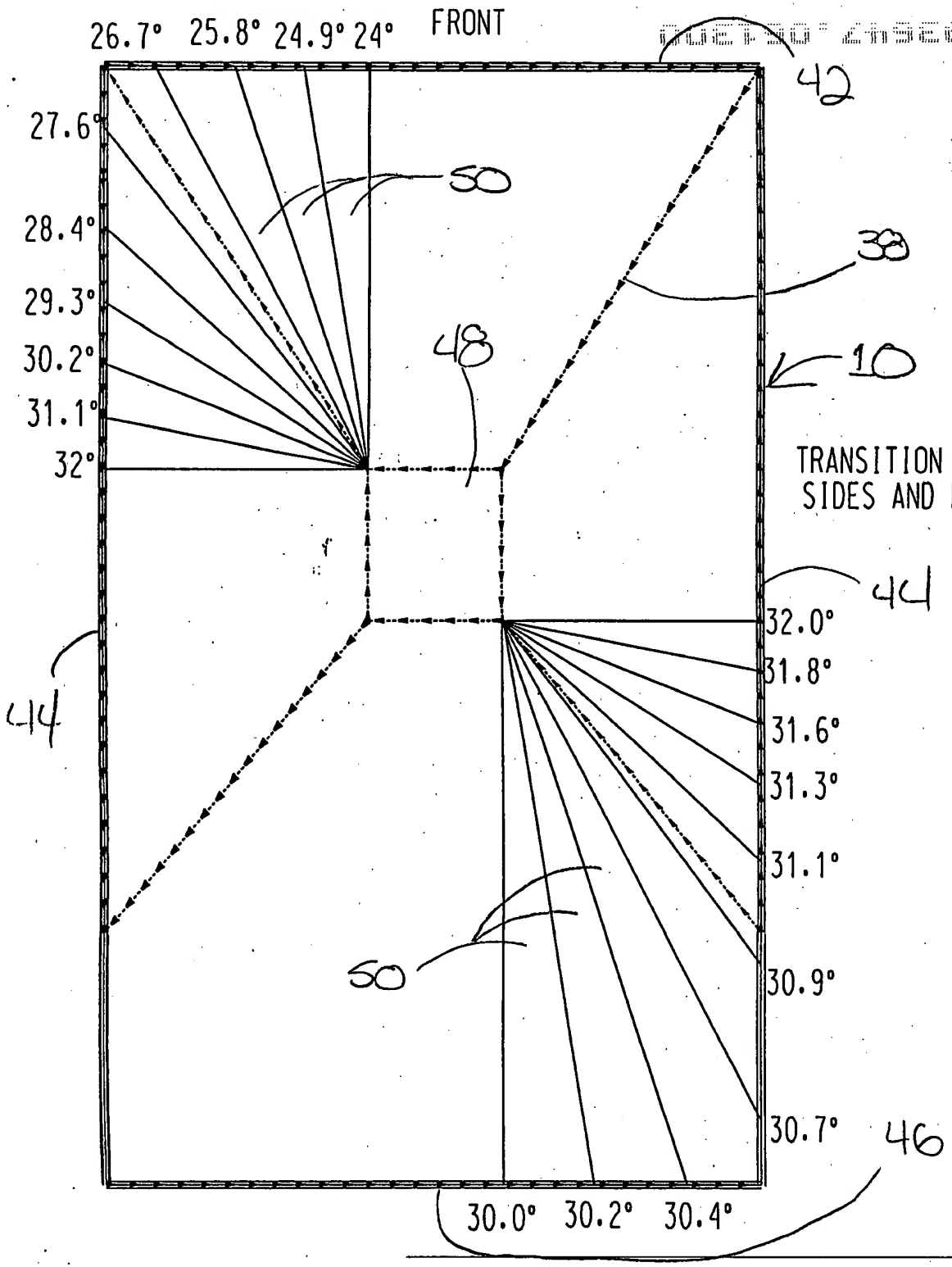
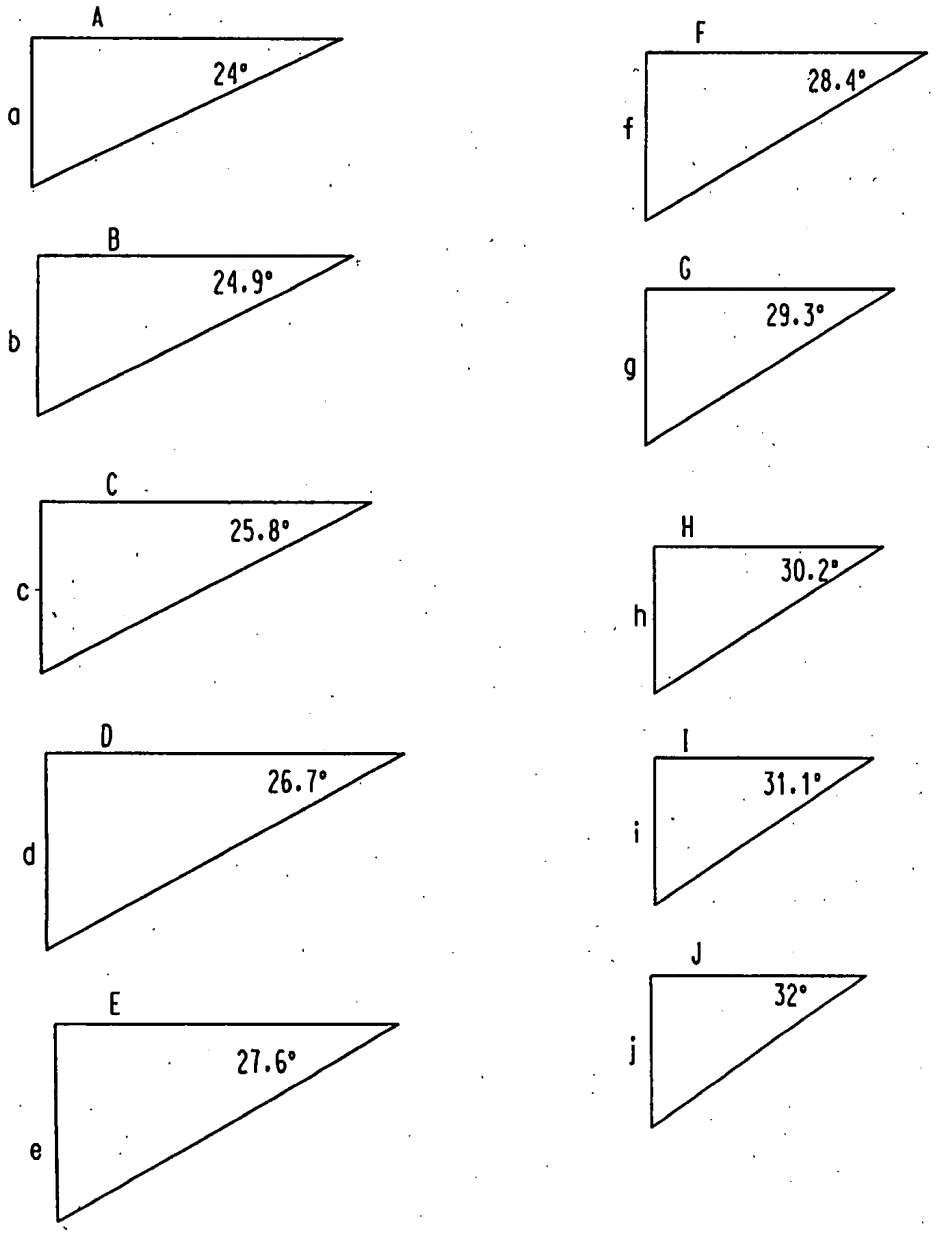


FIG. 9

Step 8, cont.

TRANSITION BETWEEN SIDES AND FRONT AND SIDES AND REAR ARE BROKEN INTO EQUAL 10° SEGMENTS.



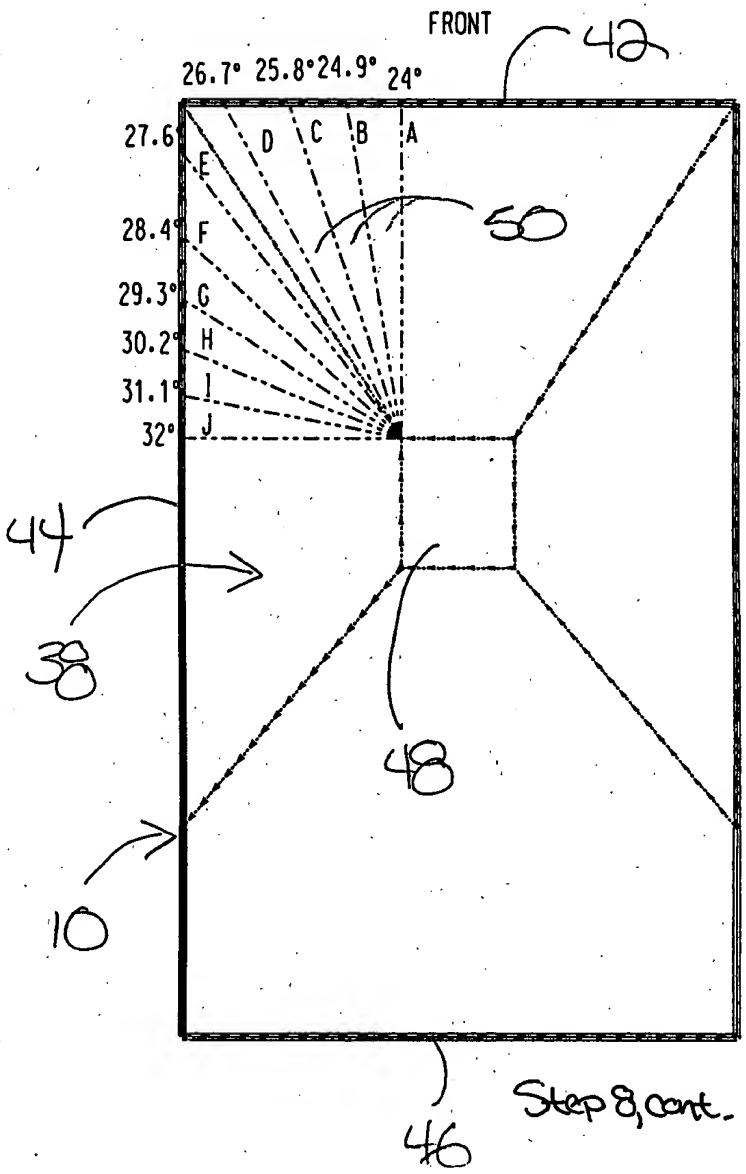
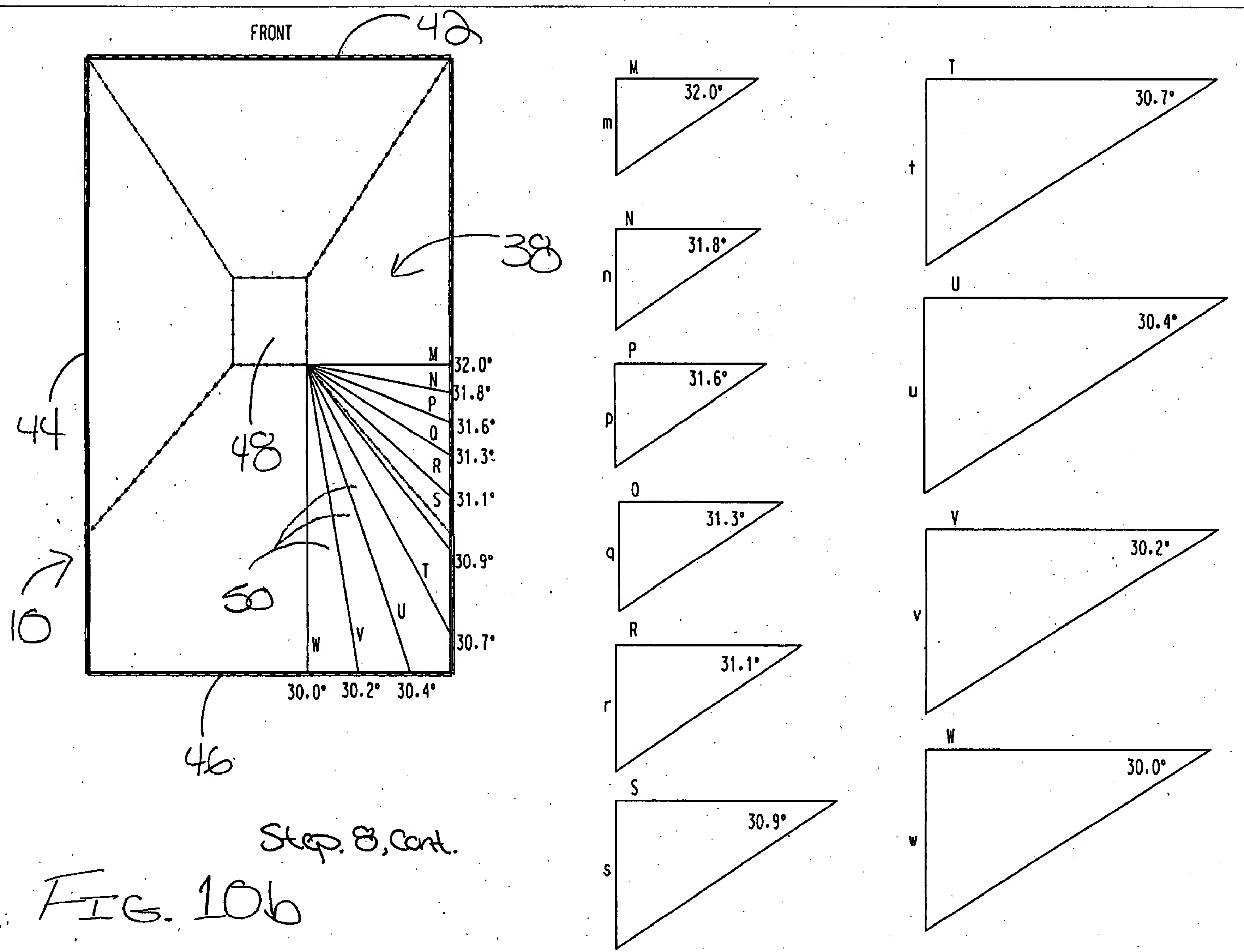


FIG. 10a



Step. 8, Cont.

FIG. 10b

FIG. 10C

Step 8, cont.

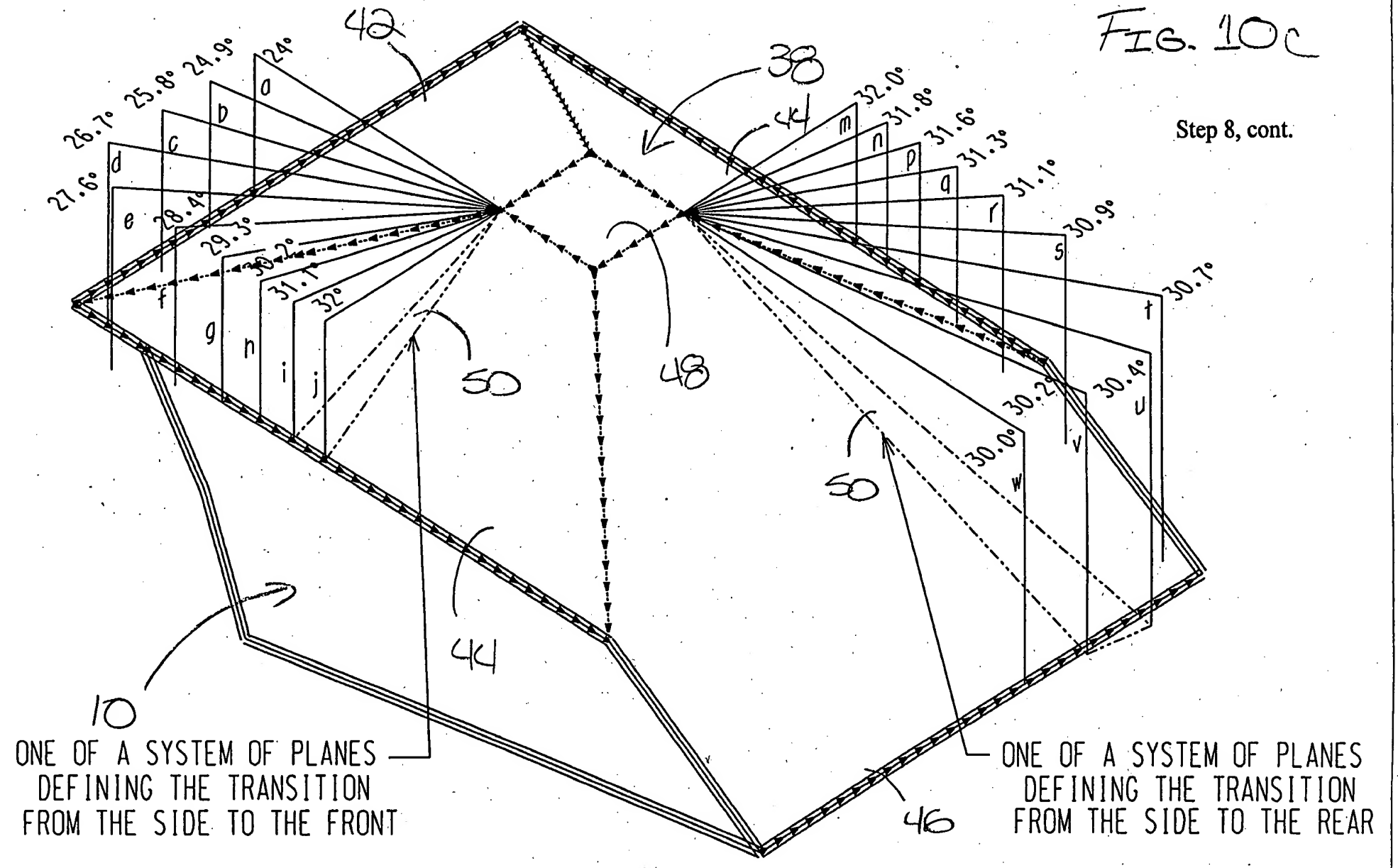


FIG. 11

Step 8, cont.

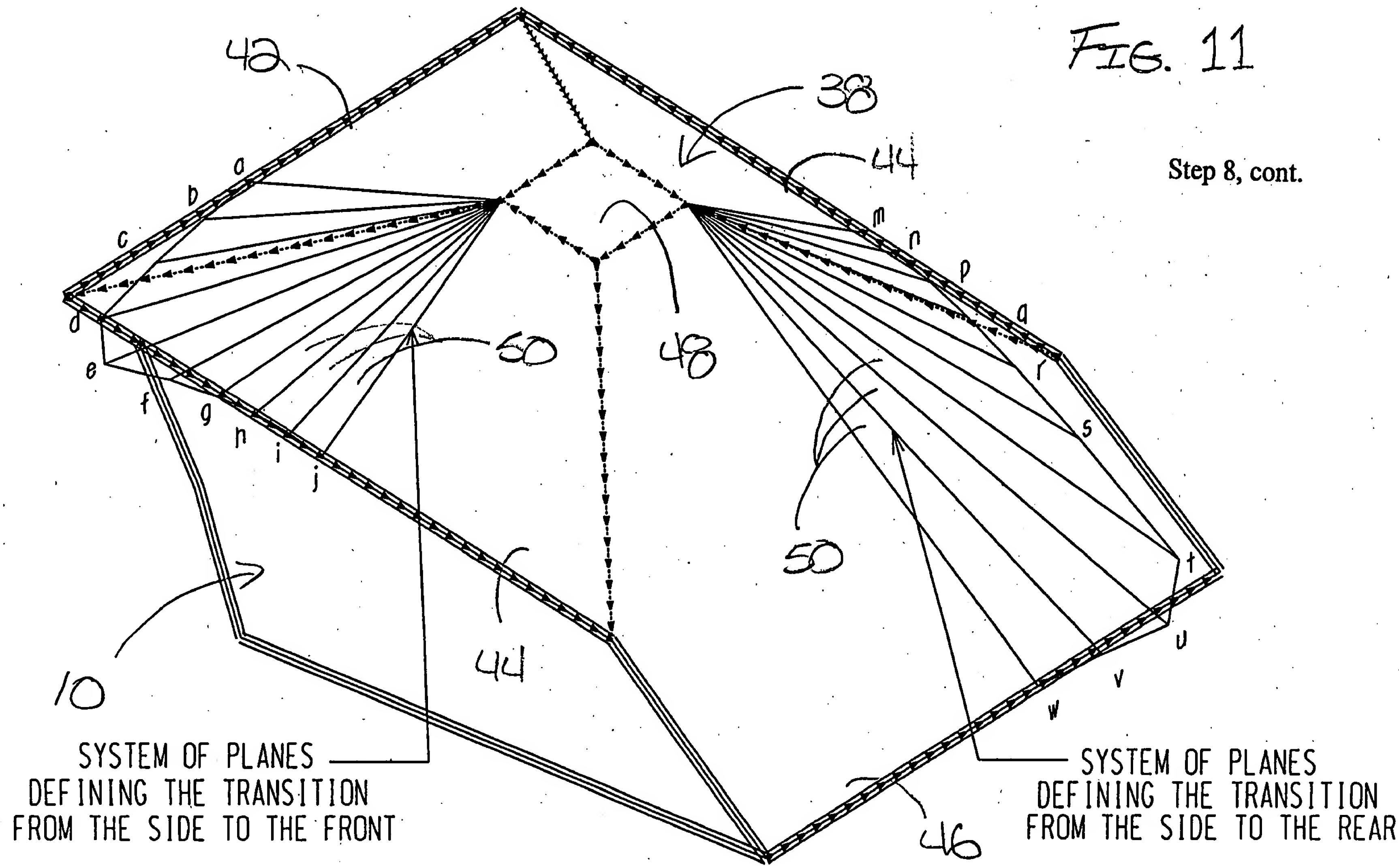
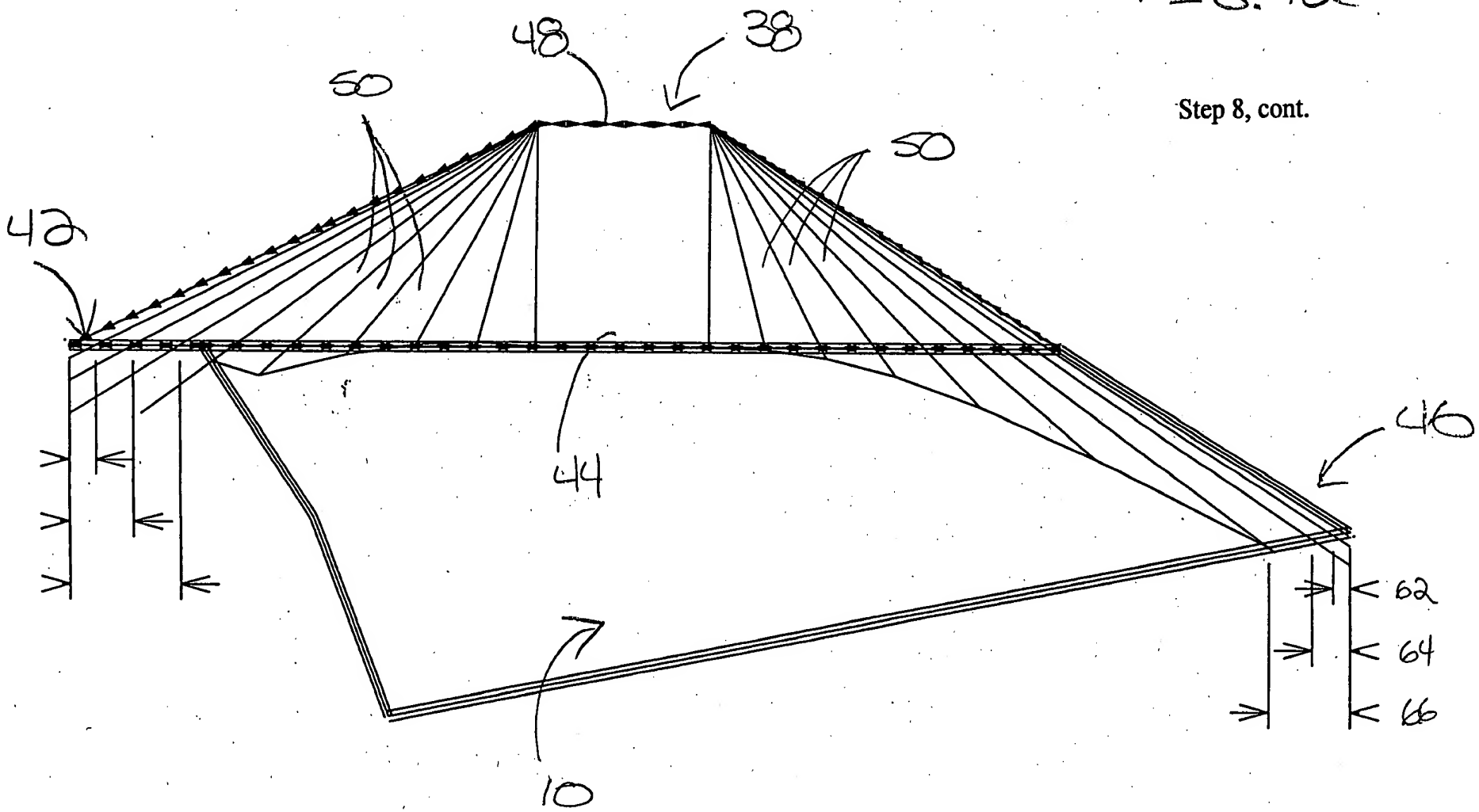


FIG. 12

Step 8, cont.



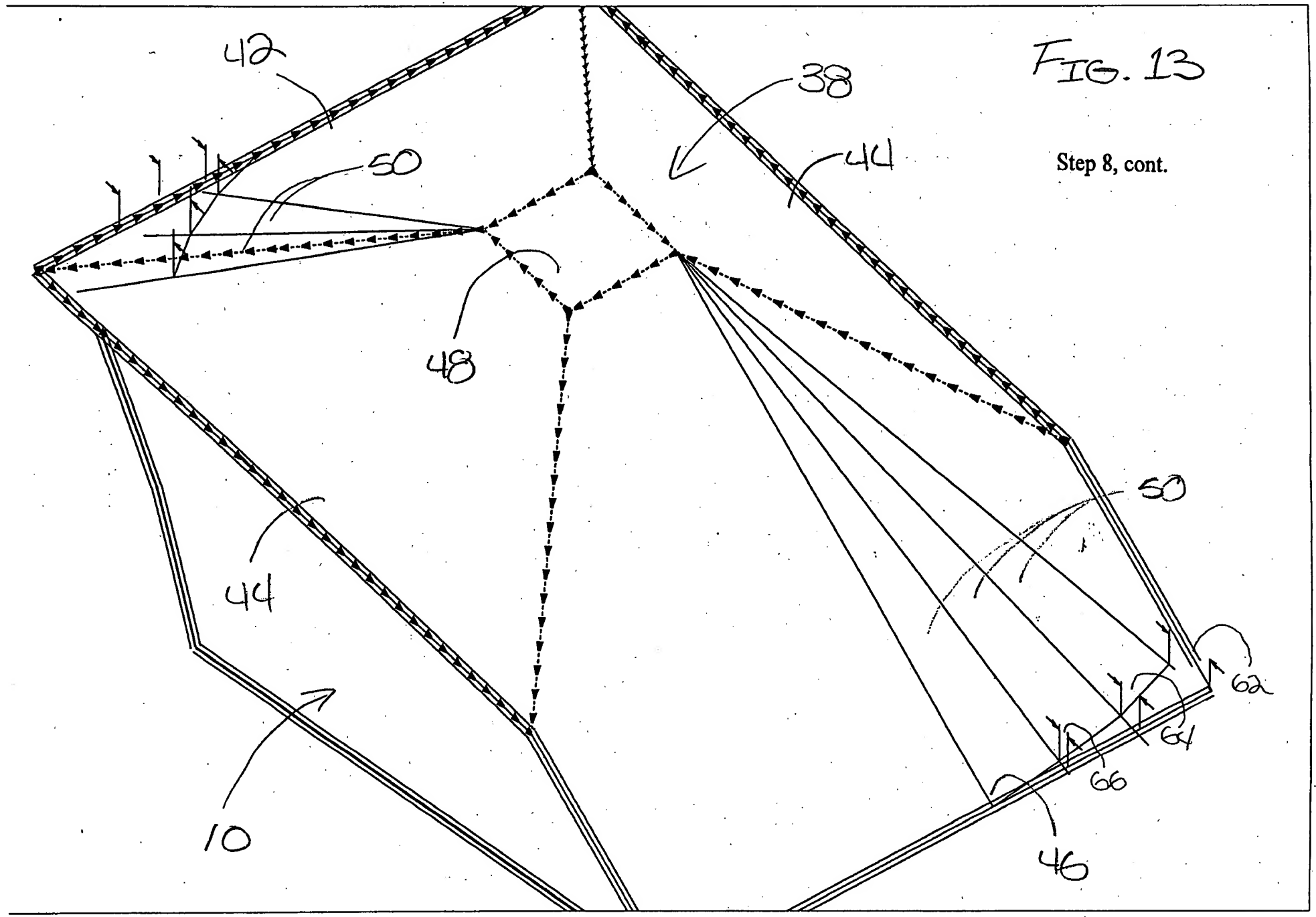


FIG. 13

Step 8, cont.

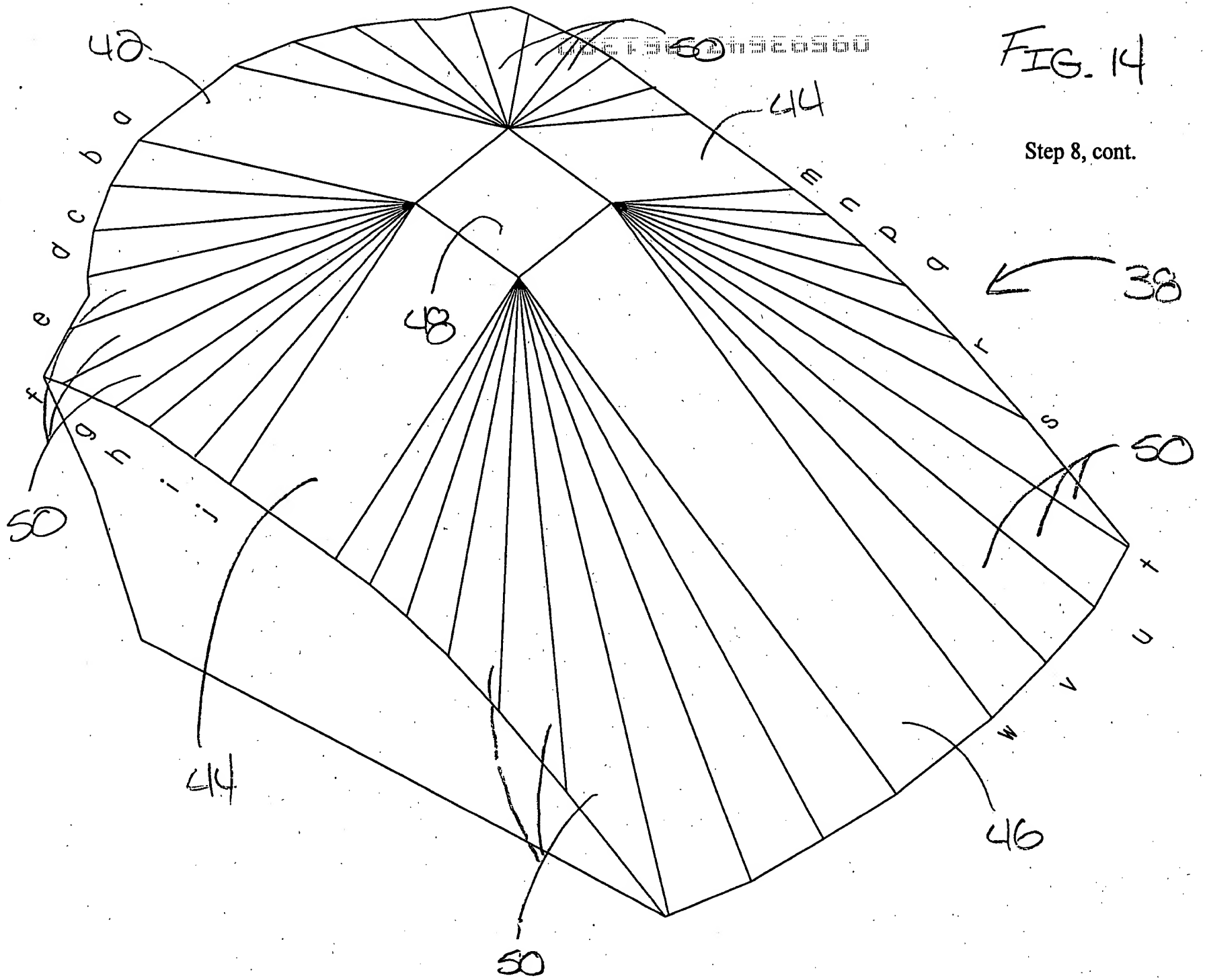


FIG. 14

Step 8, cont.

FIG. 15

Step 8, cont.

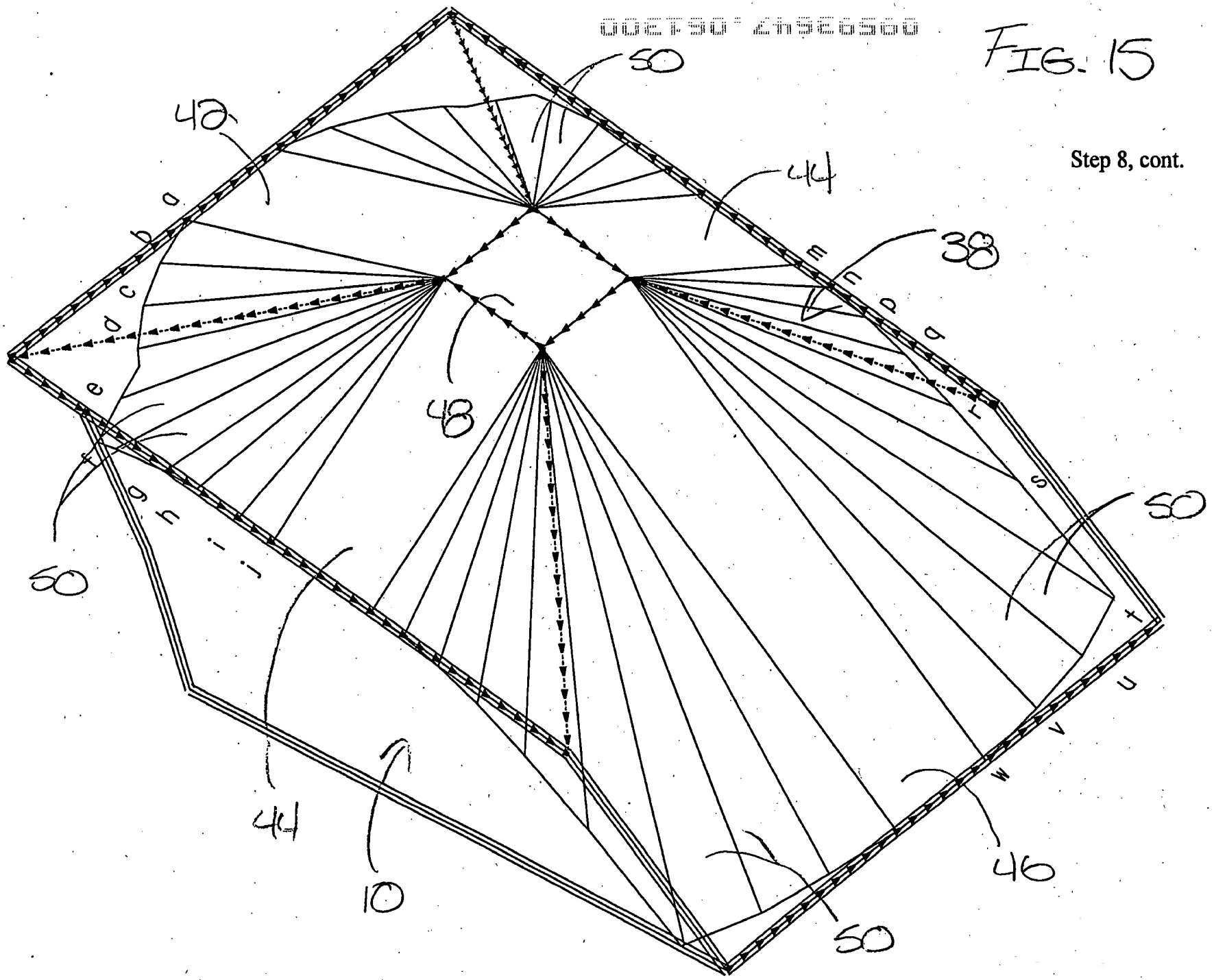
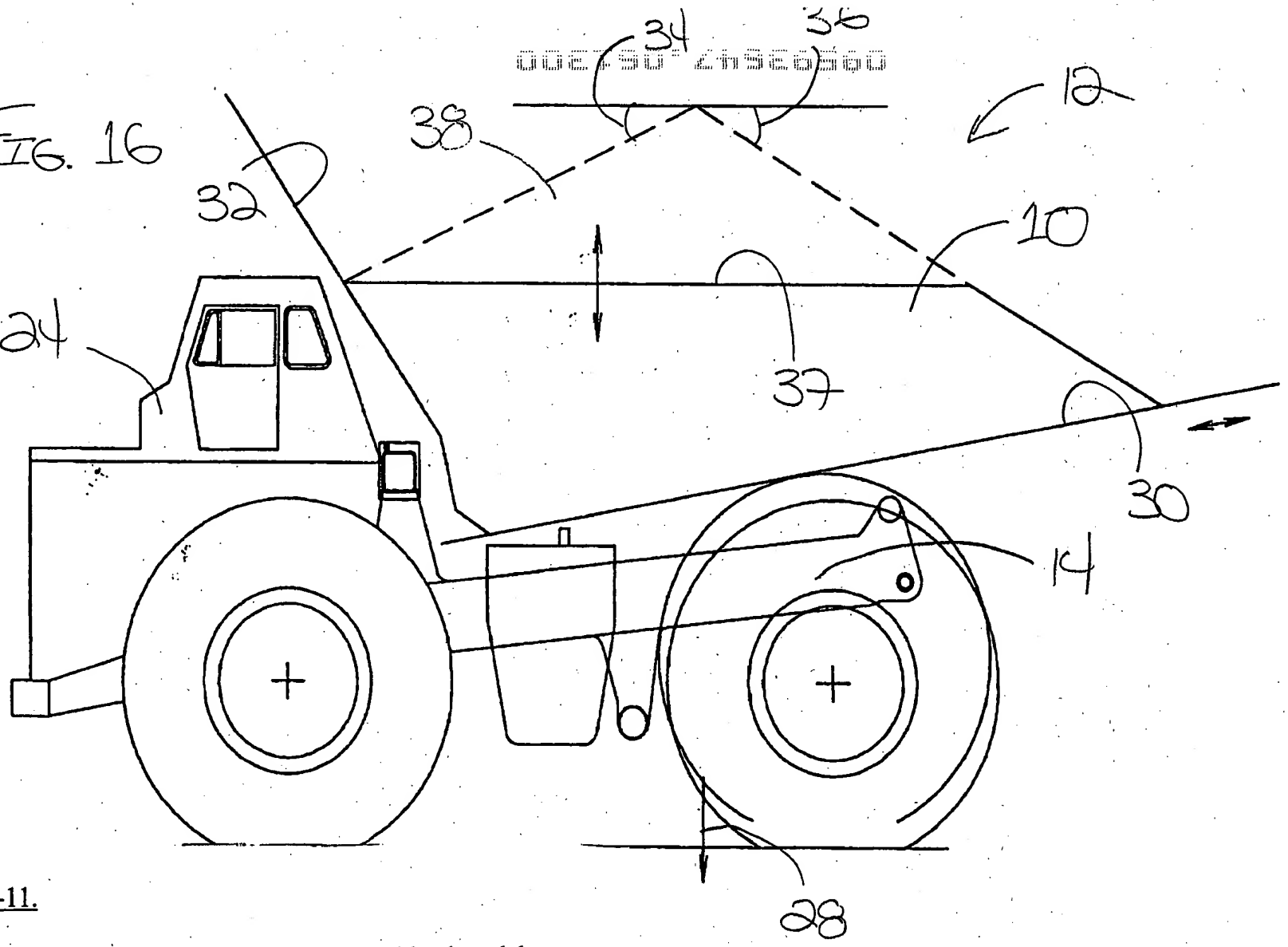


FIG. 16



Steps 9-11.

The center of gravity of the three-dimensional load model of Step 8 is determined and then compared to the correct center of gravity of the load as determined in Step 2.

If the center of gravity of the three-dimensional load model is not properly positioned, then a new three dimensional load model is created based on the customer specific data and through adjustment of the design parameters of the dump body in an iterative process so that the load center of gravity of the load model is placed in the desired position.

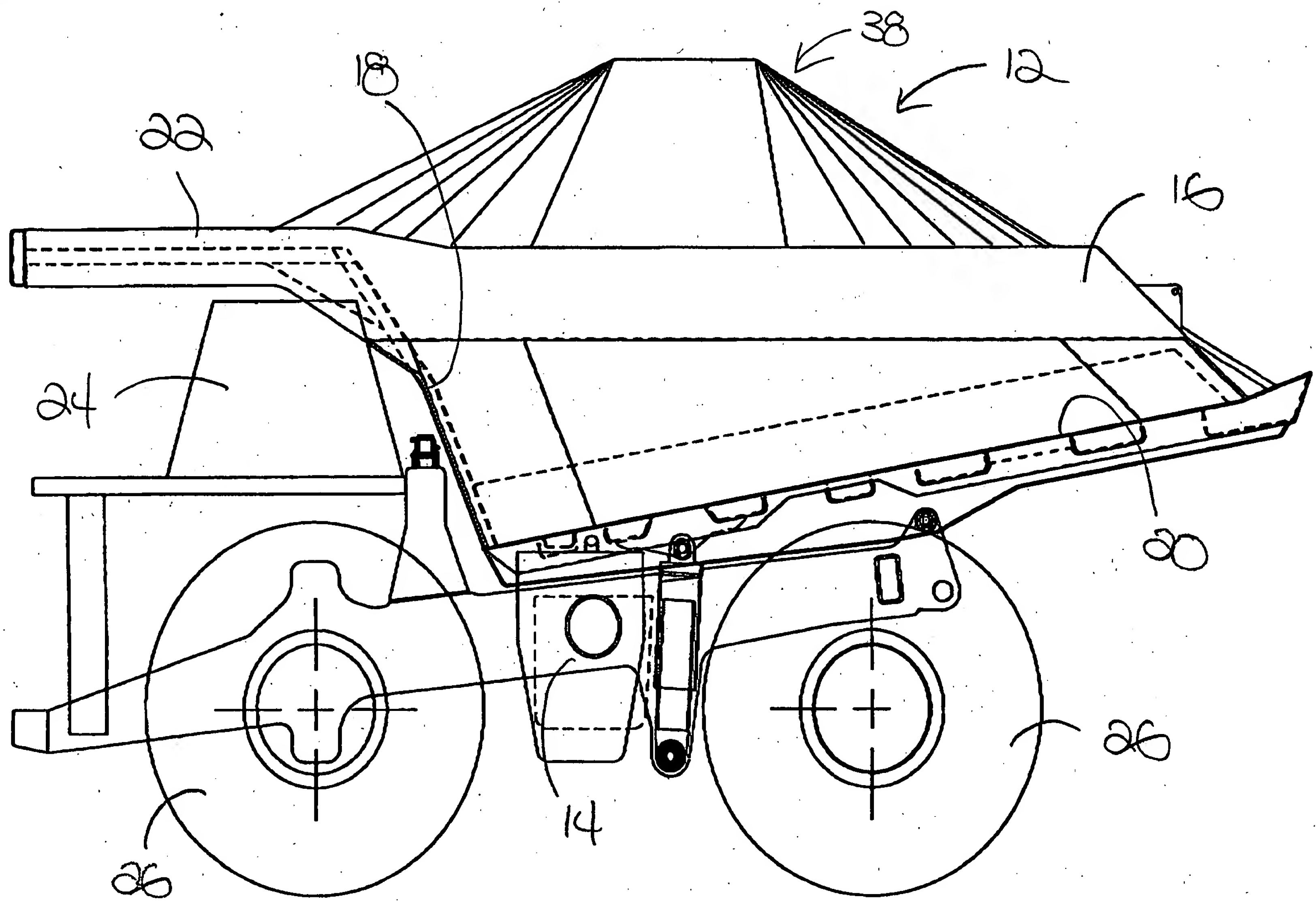


FIG. 17

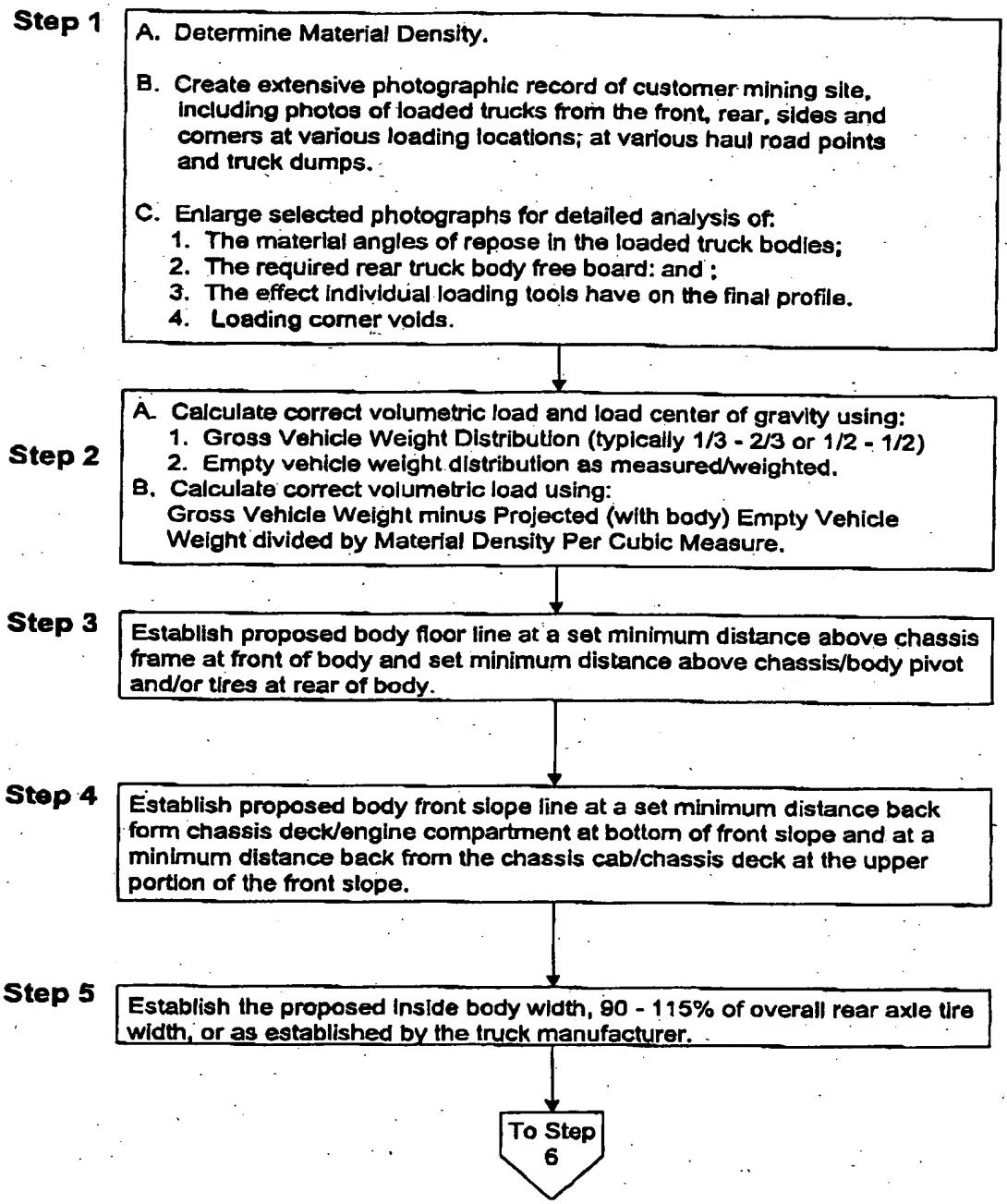
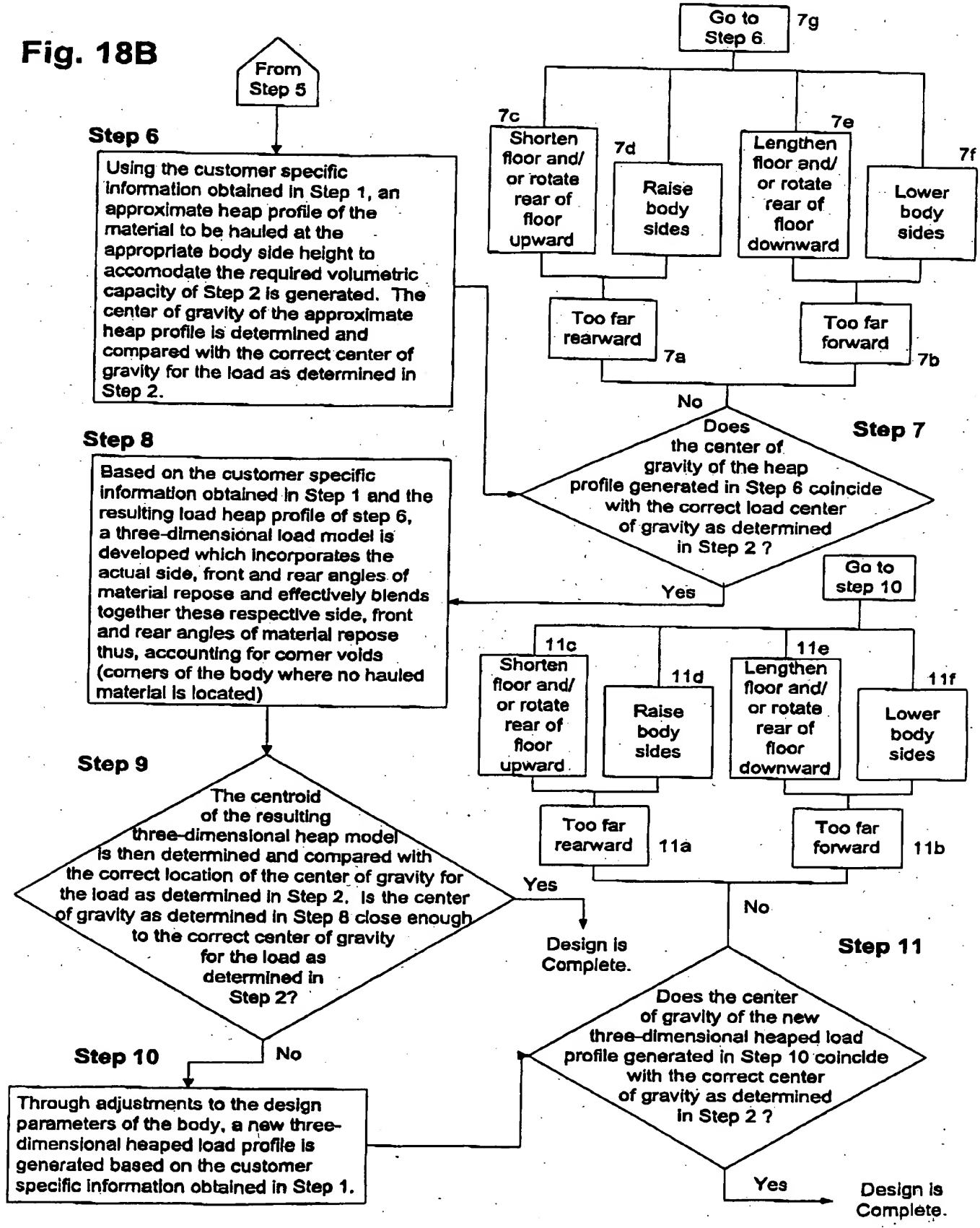
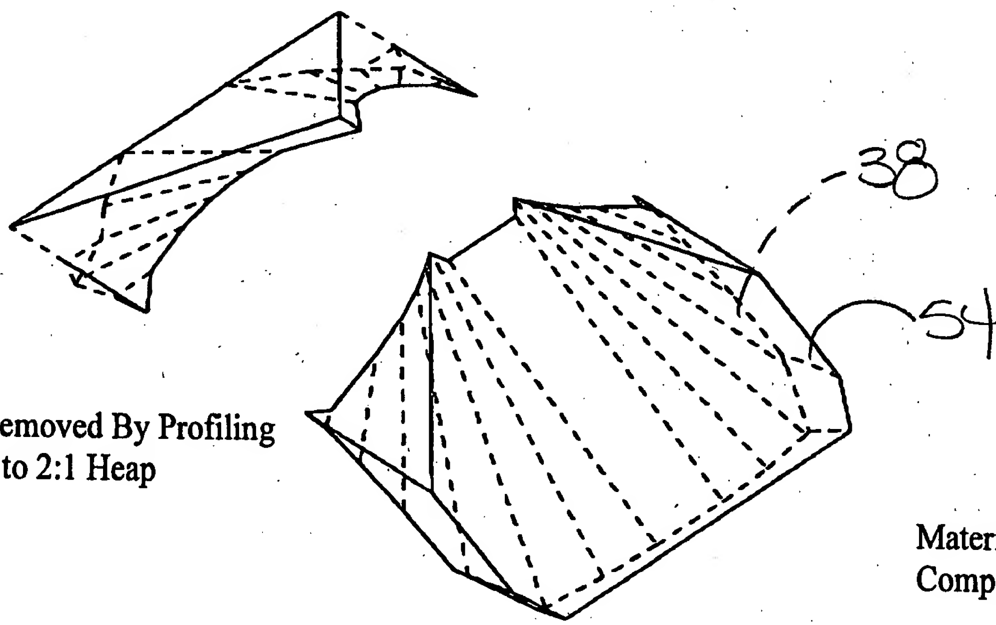

Step 1
A. Determine Material Density.
B. Create extensive photographic record of customer mining site, including photos of loaded trucks from the front, rear, sides and corners at various loading locations; at various haul road points and truck dumps.
C. Enlarge selected photographs for detailed analysis of:
1. The material angles of repose in the loaded truck bodies;
2. The required rear truck body free board: and ;
3. The effect individual loading tools have on the final profile.
4. Loading corner voids.
Step 2
A. Calculate correct volumetric load and load center of gravity using:
1. Gross Vehicle Weight Distribution (typically 1/3 - 2/3 or 1/2 - 1/2)
2. Empty vehicle weight distribution as measured/weighted.
B. Calculate correct volumetric load using:
Gross Vehicle Weight minus Projected (with body) Empty Vehicle Weight divided by Material Density Per Cubic Measure.
Step 3
Establish proposed body floor line at a set minimum distance above chassis frame at front of body and set minimum distance above chassis/body pivot and/or tires at rear of body.
Step 4
Establish proposed body front slope line at a set minimum distance back form chassis deck/engine compartment at bottom of front slope and at a minimum distance back from the chassis cab/chassis deck at the upper portion of the front slope.
Step 5
Establish the proposed inside body width, 90 - 115% of overall rear axle tire width, or as established by the truck manufacturer.
To Step 6

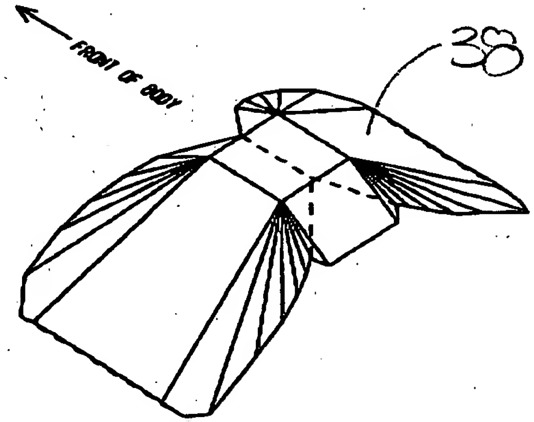
Fig. 18A

Fig. 18B

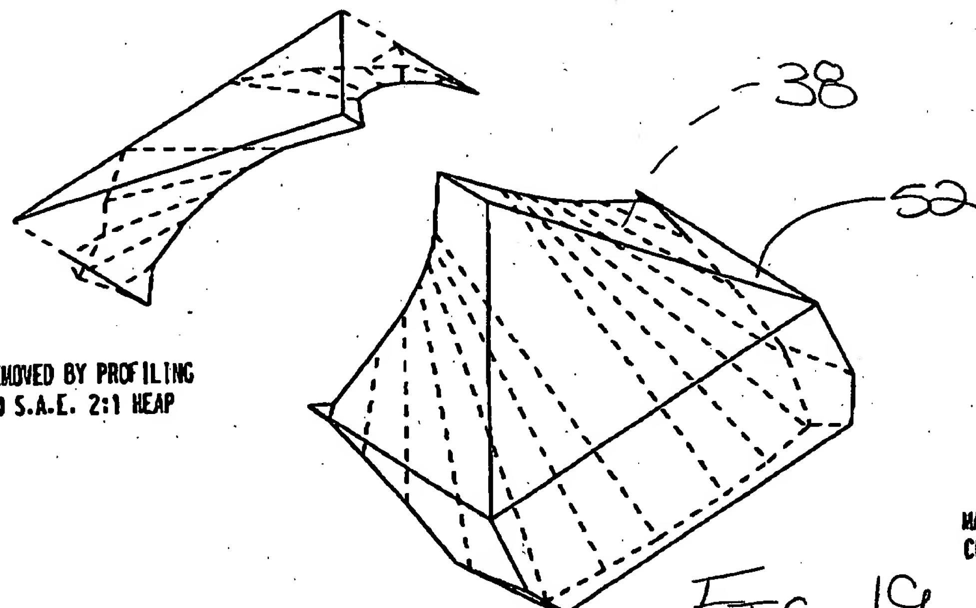

From Step 5
Step 6
Using the customer specific information obtained in Step 1, an approximate heap profile of the material to be hauled at the appropriate body side height to accomodate the required volumetric capacity of Step 2 is generated. The center of gravity of the approximate heap profile is determined and compared with the correct center of gravity for the load as determined in Step 2.
Step 8
Based on the customer specific information obtained in Step 1 and the resulting load heap profile of step 6, a three-dimensional load model is developed which incorporates the actual side, front and rear angles of material repose and effectively blends together these respective side, front and rear angles of material repose thus, accounting for corner voids (corners of the body where no hauled material is located)
Step 9
The centroid of the resulting three-dimensional heap model is then determined and compared with the correct location of the center of gravity for the load as determined in Step 2. Is the center of gravity as determined in Step 8 close enough to the correct center of gravity for the load as determined in Step 2?
Yes
Design is Complete.
No
Step 10
Through adjustments to the design parameters of the body, a new three-dimensional heaped load profile is generated based on the customer specific information obtained in Step 1.
Go to Step 6
7g
7c
Shorten floor and/ or rotate rear of floor upward
7d
Raise body sides
7e
Lengthen floor and/ or rotate rear of floor downward
7f
Lower body sides
Too far rearward
7a
Too far forward
7b
No
Step 7
Does the center of gravity of the heap profile generated in Step 6 coincide with the correct load center of gravity as determined in Step 2 ?
Yes
Go to step 10
11c
Shorten floor and/ or rotate rear of floor upward
11d
Raise body sides
11e
Lengthen floor and/ or rotate rear of floor downward
11f
Lower body sides
Too far rearward
11a
Too far forward
11b
No
Step 11
Does the center of gravity of the new three-dimensional heaped load profile generated in Step 10 coincide with the correct center of gravity as determined in Step 2 ?
Yes
Design is Complete.



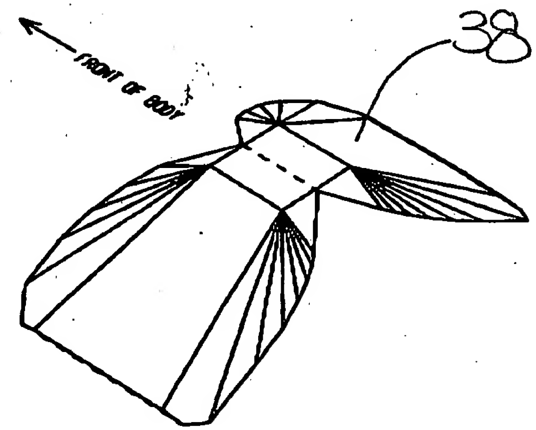
Material Removed By Profiling
Compared to 2:1 Heap



Material Added By Profiling
Compared to 2:1 Heap

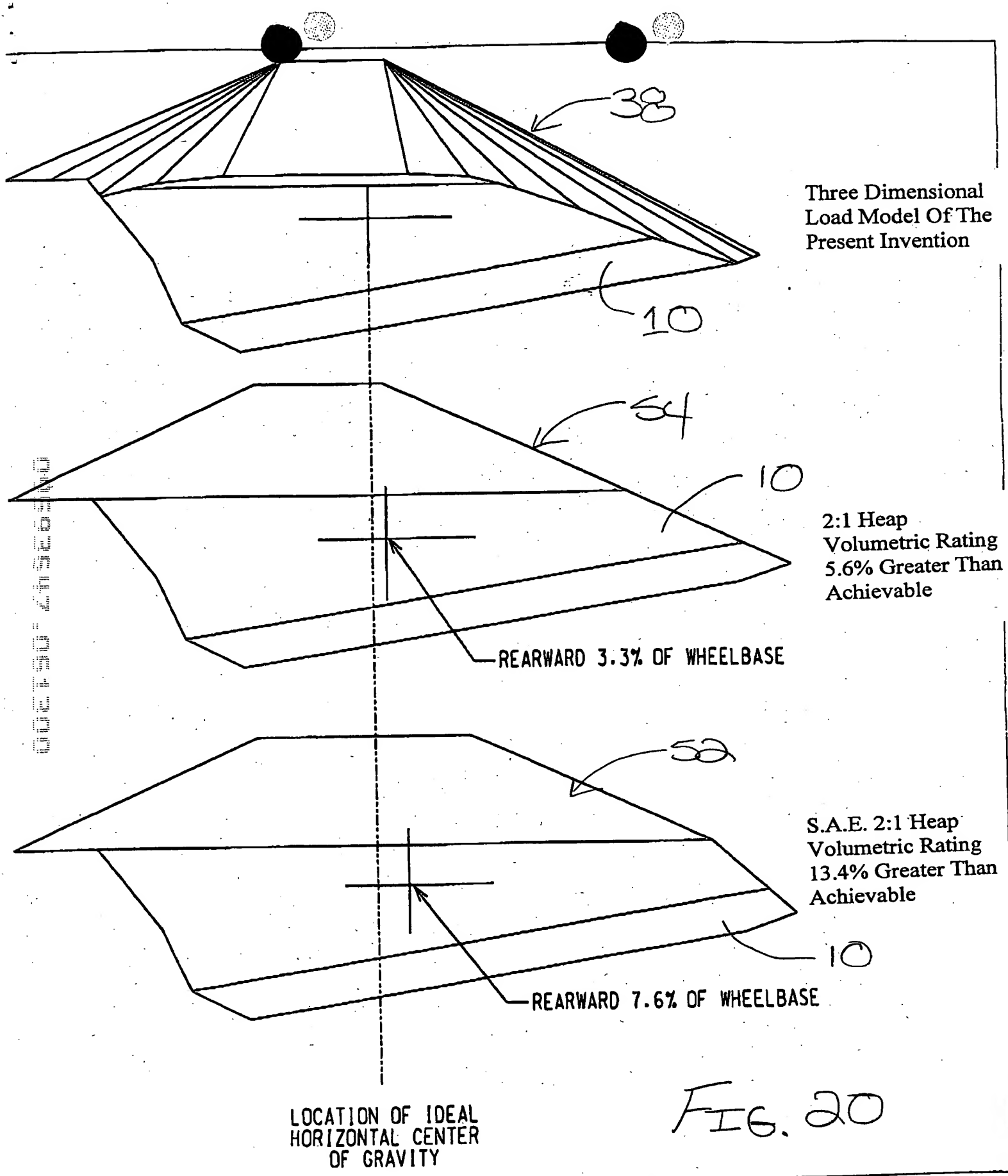


MATERIAL REMOVED BY PROFILING
COMPARED TO S.A.E. 2:1 HEAP



MATERIAL ADDED BY PROFILING
COMPARED TO S.A.E. 2:1 HEAP

FIG. 19



Three Dimensional Load Model Of The Present Invention

2:1 Heap Volumetric Rating 5.6% Greater Than Achievable

S.A.E. 2:1 Heap Volumetric Rating 13.4% Greater Than Achievable

FIG. 20

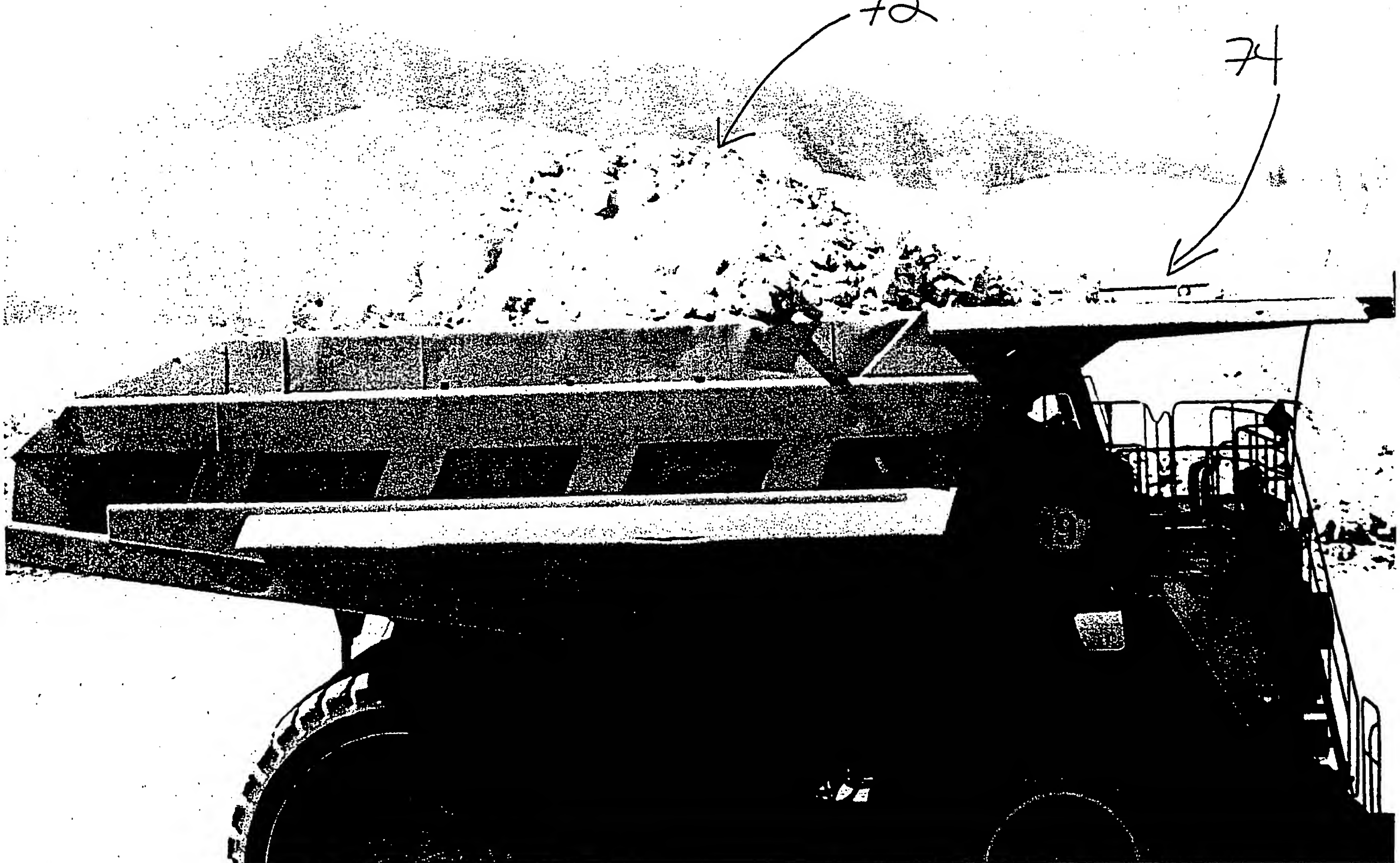


FIG. 21

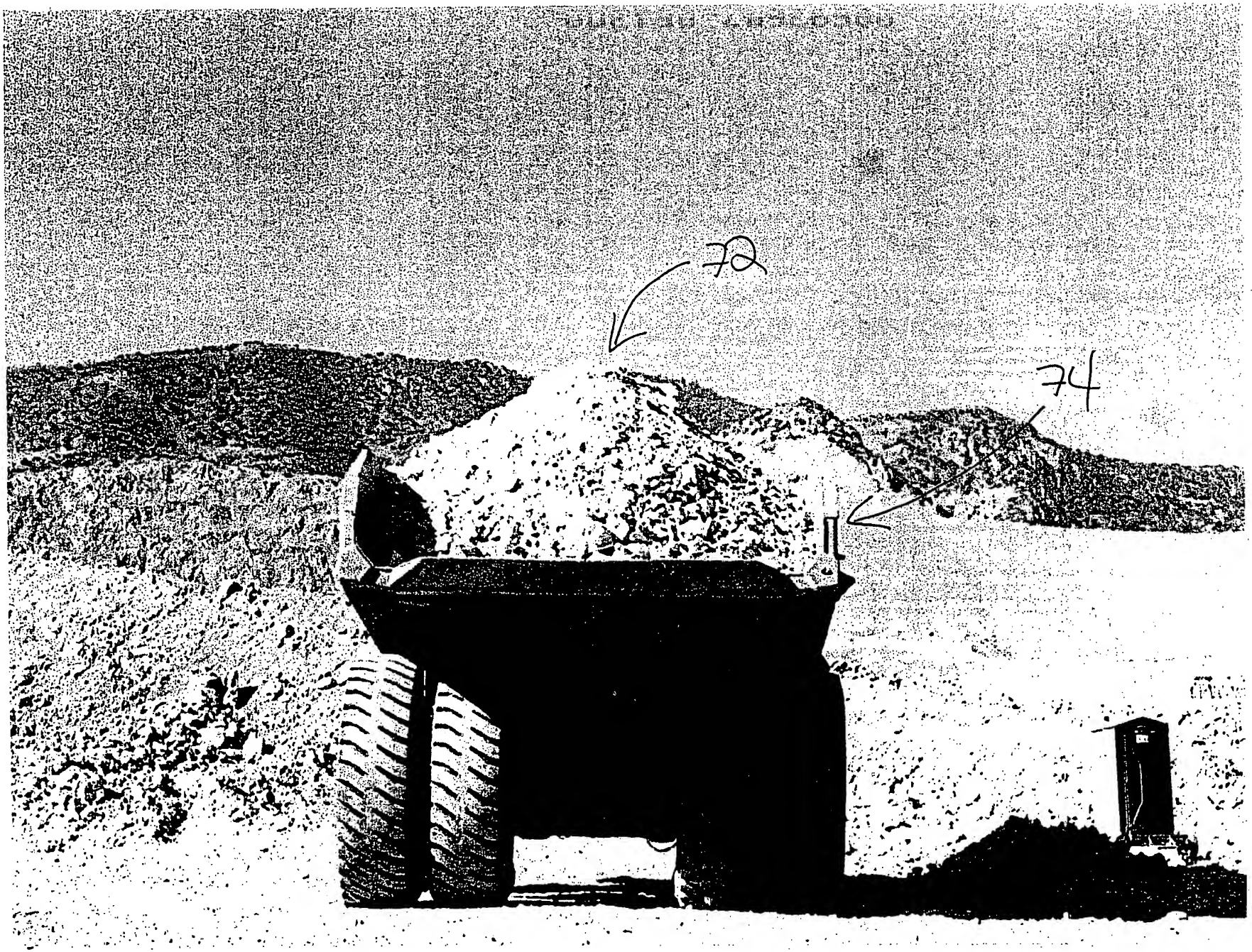


FIG. 22

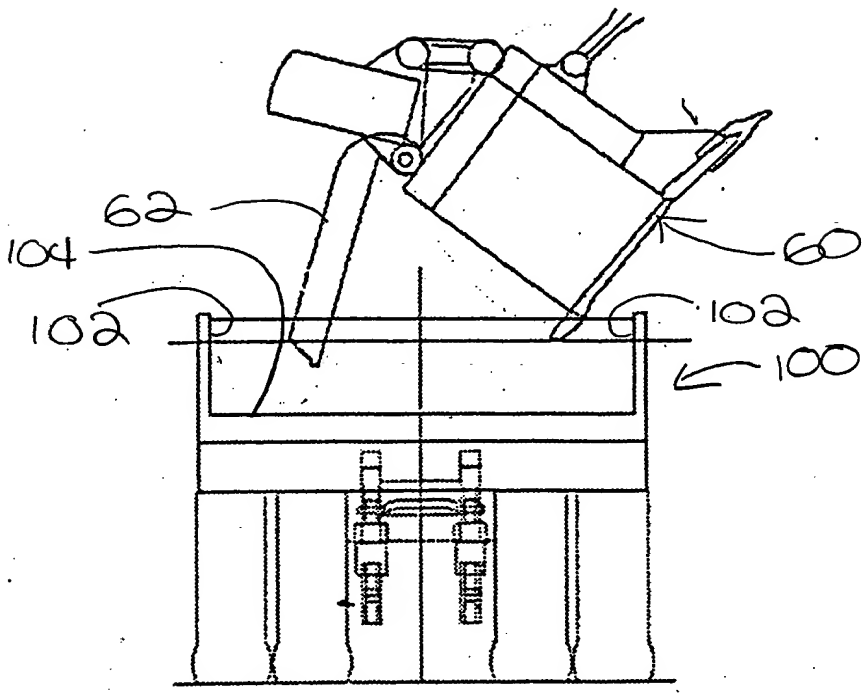


FIG. 23

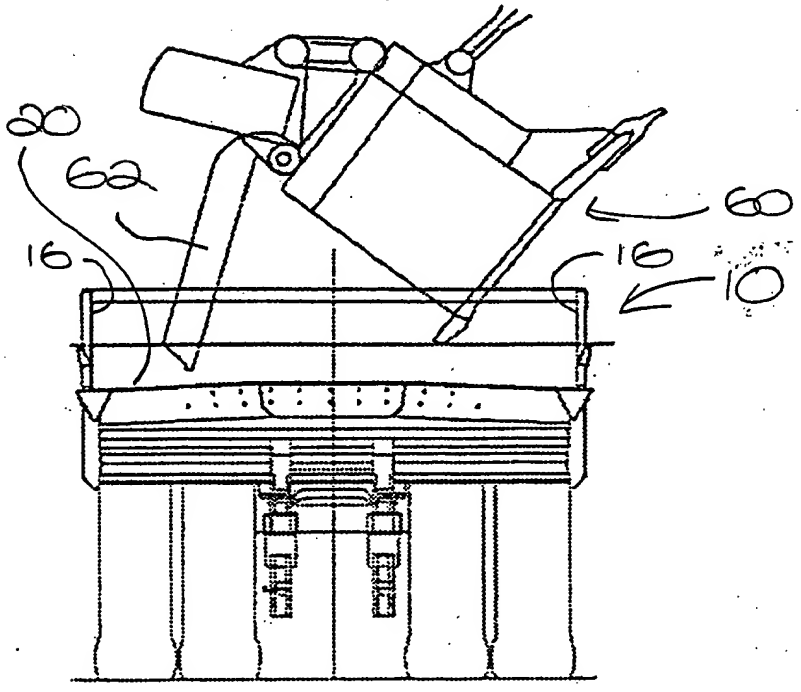


FIG. 24

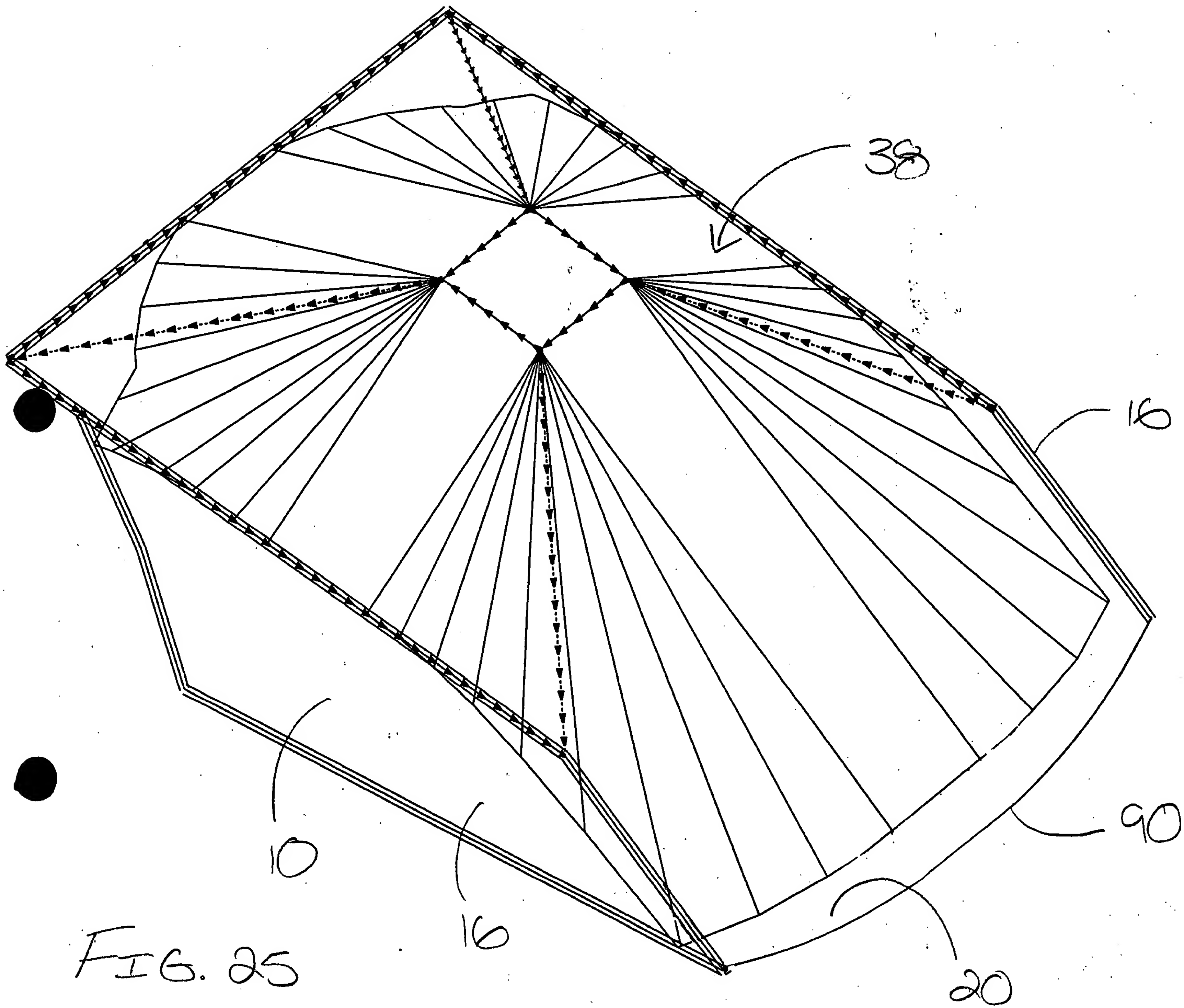


FIG. 25